3.1 内燃机的排气系统、机器处所、起居处所和其它处所的进气系统应布置在进气口或排气口远离经常有海员出入的位置。

3.2 当需要时，应装置消音器或衰减器。

3.3 为了将起居处所的噪声级降至最小，通常必须将排气系统和某些管道布置的舱棚、舱壁等等进行分隔。

4 机械的围蔽

4.1 在连续有人值班处所或有理由预计海员为了保养或检修须花费冗长时间的处所以及本附录第2节详述的分隔实际上不可行的处所，可能不得不考虑给某些将产生超过本规则第4.2段所规定的极限声压级的机器和机械安装隔音围蔽装置或部分围蔽装置。

4.2 当安装于上述第4.1段所指处所内的机械或机器所产生的噪声级属于本规则第5.3.1段标准和图5.1中的A区域之内时，提供噪声减小措施是至为必要的。

4.3 当安装隔音围蔽装置时，重要的是它们必须把噪声源完全围蔽起来。

5 艉部噪声的减小

为了减少船舶艉部（特别是起居处所内）的噪声影响，应在设计艉部、推进器等等的过程中考虑噪声的反射问题。

6 操作者的围蔽

6.1 在多数机器处所内，采取提供已减小噪声的控制室或其它类似处所（见本附录的第2.1段）的办法来保护进行操作或值守的海员，是需要和适宜的。

6.2 在噪声级超过85dB(A)的小船和现有船舶的连续有人值班的机器处所内，最好在值守人员会花大部分时间在那里的控制室或操作平台内提供一个庇护处。

7 起居处所内的控制

7.1 为了减小起居处所内的噪声级，可能需要考虑用弹性装配材料将包括有此类处所的甲板室与船舶的其余结构分隔。

7.2 还应考虑在起居处所内的舱壁、衬板和天花板以及浮置地板的相接处设置柔性连结。

7.3 在起居处所内的舷窗和窗户配备窗帘并使用地毯，这对吸收噪声有所帮助。

8 机械的选择

8.1 在设计阶段应考虑到安装的每台机械所产生的声音。采用产生较小的由空气、液体或结构发出的声音的机器以控制噪声是可能的。

8.2 应要求制造商提供其机械所产生声音的资料，还要他们提供建议的安装方法以将噪声级降至最小。

9 检查和维修

所有各台机械、设备和有关的工作处所，应有有资格的人员在噪声方面进行定期的检查。如果此种检查发现噪声控制手段方面的缺陷或发现导致过多噪声的缺陷，应在实际可行的情况下尽快纠正。

10 振动的隔离

10.1 必要时，机器应以正确设计和安装的弹性座架来支承。

10.2 如辅助机械、空压机、液压装置、发电机组、风机、排气管系和消音器等在起居处所或驾驶台产生不能接受的噪声级时，应安装弹性座架。

10.3 当安装了隔音围蔽装置时，机器最好采用弹性座架，所有管子、大管道和电缆与机器之间最好采用柔性连结。

RESOLUTION A.468(XII)

Adopted on 19 November 1981
Agenda item 10(b)

CODE ON NOISE LEVELS ON BOARD SHIPS

A

THE ASSEMBLY,

RECALLING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization,

RECALLING ALSO resolution A.343(IX) by which it adopted the Recommendation on Methods of Measuring Noise Levels at Listening Posts,

NOTING that high noise levels on board ships could affect seafarers' health and impair the safety of the ship,

HAVING DECIDED to specify acceptable noise levels on board ships to safeguard seafarers' health and ensure the safe operation of the ship which would complement the review of resolution A.343(IX) aiming at limiting interference of shipborne noise with external audible navigational signals,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its forty-fourth session,

1. ADOPTS the Code on Noise Levels on Board Ships, the text of which is set out in the Annex to this resolution;

2. INVITES all Governments concerned:

   (a) To take appropriate steps to implement the provisions of the Code as soon as possible;

   (b) To inform IMCO of measures taken in this respect and of any experience gained from the application of the Code, together with any information requested by resolution A.343(IX).

B

THE ASSEMBLY,

HAVING ADOPTED the Code on Noise Levels on Board Ships,

RECOGNIZING this Code and the recommendations of resolution A.343(IX) as compatible and companion documents although based on different methods of sound measurements,

AUTHORIZES the Maritime Safety Committee to keep both the Code on Noise Levels on Board Ships and the Recommendation on Methods of Measuring Noise Levels at Listening Posts under review, so as to ensure that they reflect current experience gained from their application and other relevant international standards, and to consider the amalgamation of both documents.

ANNEX

CODE ON NOISE LEVELS ON BOARD SHIPS

CONTENTS

PREAMBLE

1 The Code on Noise Levels on Board Ship (hereinafter referred to as the Code) has been developed to provide guidance to Administrations on principles of noise control on board ships in general. Its purpose is to stimulate and promote noise control at a national level within the framework of internationally agreed guidelines.

2 Guidance to Administrations on maximum noise levels and noise exposure limits should be considered as the main objectives of the Code.

3 The recommendations on procedures and programmes should be regarded as an attempt to establish international uniformity rather than to set strict rules to be followed.

4 The Code has been developed having regard to conventional passenger and cargo ships. While certain types and sizes of ships have been excluded from application, it should be recognized that full application to ships which differ appreciably from the conventional types of ships regarding design or operations might need specific consideration.

5 The Code is not intended for direct incorporation by reference or reproduction in national legislation although it could provide a basis for such legislation.

6 The Organization adopted a recommendation on methods of measuring noise levels at listening posts with resolution A.343(IX). This recommendation related to interference by shipborne noise with the proper reception of external audible navigation signals and although the methods of measuring noise levels in accordance with resolution A.343(IX) and with the Code are different, these documents are considered compatible inasmuch as the Code is concerned primarily with the effect of noise on health and comfort.

CHAPTER 1 – GENERAL

1.1 Scope

1.1.1 The Code is designed to provide standards to prevent the occurrence of potentially hazardous noise levels on board ships and to provide standards for an acceptable environment for seafarers.

1.1.2 Recommendations are made for :

.1 protecting the seafarer from the risk of noise-induced hearing loss under conditions where at present it is not feasible to limit the noise to a level which is not potentially harmful;

.2 measurement of noise levels and exposure;

.3 limits on acceptable maximum noise levels for all spaces to which seafarers normally have access.

1.2 Purpose

1.2.1 The purpose of the Code is to limit noise levels and to reduce exposure to noise, in order to:

.1 provide for safe working conditions by giving consideration to the need for speech communication and for hearing audible alarms, and to an environment where clear-headed decisions can be made in control stations, navigation and radio spaces and manned machinery spaces;

.2 protect the seafarer from excessive noise levels which may give rise to a noise-induced hearing loss;

.3 provide the seafarer with an acceptable degree of comfort in rest, recreation and other spaces and also provide conditions for recuperation from the effects of exposure to high noise levels.

1.3 Application

1.3.1 The Code applies to new ships of 1,600 tons gross tonnage and over.

1.3.2 The provisions relating to potentially hazardous noise levels contained in the Code should also apply to existing ships of 1,600 tons gross tonnage and over, as far as reasonable and practicable, to the satisfaction of the Administration.

1.3.3 The Code should apply to new ships of less than 1,600 tons gross tonnage, as far as reasonable and practicable, to the satisfaction of the Administration.

1.3.4 The Code does not apply to:

dynamically supported craft;

fishing vessels;

pipe-laying barges;

crane barges;

mobile offshore drilling units;

pleasure yachts not engaged in trade;

ships of war and troopships;

ships not propelled by mechanical means.

1.3.5 For ships designed for and employed on voyages of short duration, or on other services involving short periods of operation of the ship, sections 4.2.3 and 4.2.4 may be applied only with the ship in the port condition, provided that the periods under such conditions are adequate for seafarers' rest and recreation.

1.3.6 The Code applies to ships in service, i.e. in port or at sea with seafarers on board.

1.3.7 The Code is not intended to apply to passenger cabins and other passenger spaces except in so far as they are work spaces and are covered by the provisions of the Code.

1.4 Definitions

For the purpose of the Code the following definitions apply. Additional definitions are given elsewhere in the Code.

1.4.1 ***Accommodation spaces:*** Cabins, offices (for carrying out ship's business), hospitals, mess rooms, recreation rooms (such as lounges, smoke rooms, cinemas, libraries and hobbies and games rooms) and open recreation areas to be used by seafarers.

1.4.2 ***Auxiliary machinery:*** Machinery other than main propelling machinery that is in service when the ship is in normal service, e.g. auxiliary diesel engines, turbo-generators, hydraulic motors and pumps, compressors, boiler ventilation fans, gear pumps.

1.4.3 ***A-weighted sound pressure level or noise level:*** The quantity measured by a sound level meter in which the frequency response is weighted according to the A-weighting curve (see IEC publication 651).

1.4.4 ***Continuously manned spaces:*** Spaces in which the continuous or prolonged presence of seafarers is necessary for normal operational periods.

1.4.5 ***Crane barge:*** A vessel with permanently installed cranes designed principally for lifting operations.

1.4.6 *Duty stations:* Those spaces in which the main navigating equipment, the ship's radio or the emergency source of power are located or where the fire recording or fire control equipment is centralized and also those spaces used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, workshops other than those forming part of the machinery spaces and similar such spaces.

1.4.7 *Dynamically supported craft:* A craft which is operable on or above water and which has characteristics different from those of conventional displacement ships. Within the aforementioned generality, a craft which complies with either of the following characteristics:

.1 the weight, or a significant part thereof, is balanced in one mode of operation by other than hydrostatic forces;

.2 the craft is able to operate at speeds such that the function $\frac{v}{\sqrt{gL}}$ is equal to or greater than 0.9, where "v" is the maximum speed, "L" is the water-line length and "g" is the acceleration due to gravity, all in consistent units.

1.4.8 *Ear protector:* A device worn to reduce the level of noise heard by the wearer.

1.4.9 *Effective sound level $L_{ef(X)}(H)$:* A notional continuous sound level which is calculated from the various A-weighted sound levels and duration at these levels with an XdB exchange rate. The exchange rate is the number of dB decrease in noise level which would allow doubling of exposure time. $L_{ef(3)}(H)$ is equal to $L_{eq}(H)$. In instances of fluctuating noise and intermittent exposures 5dB is often used for X. "H" represents the time period concerned expressed in hours.

1.4.10 *Equivalent continuous sound level $L_{eq}(H)$:* A notional level which would in the course of a given time period (H) cause the same A-weighted sound energy to be received as that due to the actual sound over the period. "H" represents the time period concerned expressed in hours.

$$L_{eq} = 10 \log_{10} \frac{1}{T} \int_0^T \frac{\left(p_a(t)\right)^2}{p_o^2} .dt$$

where: T = measurement time

$p_a(t)$ = A-weighted instantaneous sound pressure

p_o = 20×10^{-6} pascal (the reference level).

1.4.11 *Fishing vessel:* A vessel used commercially for catching fish, whales, seals, walrus or other living resources of the sea.

1.4.12 *Fluctuating noise:* Noise which is varying in level rising and falling. For the purpose of this Code it may be taken to mean fluctuations in excess of the steady noise as defined in 1.4.31 and excludes impulse noise as defined in 1.4.14.

1.4.13 ***Hearing loss:*** Hearing loss is evaluated in relation to a reference auditory threshold defined conventionally in ISO Standard 389 (1975). The hearing loss corresponds to the difference between the auditory threshold of the subject being examined and the reference auditory threshold. ISO Standard 1999 (1975)* takes an average loss of 25 dB calculated at frequencies 500, 1,000 and 2,000 Hz.

1.4.14 ***Impulse noise:*** Noise of less than one second's duration which occurs as an isolated event, or as one of a series of events with a repetition rate of less than 15 times per second.

1.4.15 ***Integrating sound level meter:*** A sound level meter designed or adapted to measure the level of the mean squared time averaged A-weighted sound pressure.

1.4.16 ***ISO noise rating (NR) number:*** The number found by plotting the octave band spectrum on the NR curves given in ISO Standard R 1996-1967 and selecting the highest noise rating curve to which the spectrum is tangent.

1.4.17 ***Machinery spaces:*** All spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery and similar spaces, and trunks to such spaces.

1.4.18 ***Mobile offshore drilling unit:*** A vessel capable of engaging in drilling operations for the exploration for, or exploitation of, resources beneath the sea-bed, such as liquid or gaseous hydrocarbons, sulphur or salt.

1.4.19 ***Navigating bridge wings:*** Those parts of the ship's navigating bridge extending towards the ship's sides.

1.4.20 ***Noise:*** For the purpose of the Code all sound which can result in hearing impairment, or which can be harmful to health or be otherwise dangerous.

1.4.21 ***Noise induced hearing loss:*** A hearing loss, originating in the nerve cells within the cochlea, attributable to the effects of sound.

1.4.22 ***Noise level:*** See A-weighted sound pressure level (1.4.3).

1.4.23 ***Normal service shaft speed:*** The shaft speed specified for the ship's acceptance on initial delivery, or after being modified, as applicable.

1.4.24 ***Occasional exposures:*** Those exposures typically occurring once per week, or less frequently.

1.4.25 ***Passenger:*** Any person on board other than the master and members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship.

1.4.26 ***Pipe-laying barge:*** A vessel specifically constructed for, or used in conjunction with, operations associated with the laying of submarine pipelines.

1.4.27 ***Port condition:*** The condition in which all machinery solely required for propulsion is stopped.

---

* This Standard is at present (January 1981) being revised.